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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,298	02/06/2004	William Allen Rogers JR.	VEL03-GN003	5458

30074 7590 06/16/2008  
TAFT, STETTINIUS & HOLLISTER LLP  
SUITE 1800  
425 WALNUT STREET  
CINCINNATI, OH 45202-3957

EXAMINER
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MERKLING, MATTHEW J

ART UNIT	PAPER NUMBER
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1795

MAIL DATE	DELIVERY MODE
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06/16/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/774,298	<b>Applicant(s)</b> ROGERS ET AL.	
	<b>Examiner</b> MATTHEW J. MERKLING	<b>Art Unit</b> 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,5-33,48,51,53-55,57,58,61,62,64 and 66-90 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,5-33,48,51,53-55,57,58,61,62,64 and 66-90 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Claim Objections***

1. Claim 66 is objected to because of the following informalities: Claim 66 is dependent upon a cancelled claim. For purposes of this examination, claim 66 will be treated as being dependent from claim 1. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 5, 6, 7-12, 16-31, 33, 51, 55, 57, 61, 62, 64, 66-70 and 74-90 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gonjo et al. (US 6,159,434) in view of Reiser (GB 2128013).

Regarding claims 1, 5, 6, 10-12, 16-31, 33, 57, 64, 66, 67, 74-76 and 78-87, Gonjo discloses a chemical process system comprising:

a first chemical reactor (reformer, 4, see Fig. 1 A) comprising microchannels (compact plate style reformer with channels, see col. 28 lines 32-38 and see channels in Figs 6 and 7, for example) adapted to be in fluid communication with an inlet stream (liquid feed, see Fig. 1 A) and an outlet stream (Reformed Gas, see Fig. 1A) for carrying out a continuous process;

a second chemical reactor (catalytic combustor 6a and 6b, see Fig. 1 A) in thermal communication with the first chemical reactor (see Fig. 1A, where catalytic combustion portions 6a and 6b are in thermal communication with reforming portion 4);

a heat exchanger (heat recovery portion, for example, see Fig. 1A) comprising microchannels (as mentioned above) in fluid communication with the first chemical reactor (see flow directions of fluid in Fig. 1A);

wherein the first and second chemical reactors are coupled to each other (see flow diagram of Fig. 1A where reforming portion and catalytic combustion portion are fluidly connected); and

wherein the first and second chemical reactors also include a heat exchanger upstream and downstream from said chemical reactors (see flow diagram in Fig. 1A where inlet and outlet streams of the first and second chemical reactors are in contact with a heat exchanger).

While Gonjo teaches a plate style chemical process system that is designed to be compressed together in order to prevent leaking reactants and products (see col. 14 lines 27-35), Gonjo fails to disclose the chemical process System contained in a pressure vessel and also fails to disclose the associated pressure control devices incorporated by said pressure vessel.

Reiser also discloses a chemical process system that comprises a plate style apparatus (fuel cell stack, 10, see Fig. 1, page 1 lines 105-110) that addresses the same problem of leaking from a plate style chemical process system (see page 1 lines 53-59).

Reiser teaches: a pressure vessel (14) at least partially containing a operation therein (10, see Fig. 1 ), the pressure vessel concurrently adapted to be occupied by a medium (such as inert gas, supplied ) to compress the chemical reactor in order to prevent any leaking of reactants or products from the chemical reactor by maintaining a pressure inside the pressure vessel higher than the pressure in the chemical reactor (page 1 lines 45-52);

a stream adapted to be in fluid communication with an inert medium source (same as inert gas mentioned above) for conveying the inert medium from the inert medium source and into fluid communication with the first chemical reactor (page 1 lines 45-52); and

a recycle stream for cycling the compressive medium into and out of the pressure vessel (see flow diagram of Fig. 1).

Reiser teaches this pressure vessel as an effective means for preventing the leaking of valuable reactants and products from a chemical reactor that is comprised of a plate style apparatus (page 1 lines 45-59).

As such, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the pressure vessel and associated structure of Reiser, to the chemical process system of Gonjo in order to further prevent valuable reactants and products from leaking out of a chemical reactor.

Regarding claim 51, Gonjo further discloses the microchannels of the first chemical reactor (such as reformer 4) are coupled to the microchannels of the heat exchanger (heat recovery portion or catalytic combustor, see Fig. 1A).

Regarding claims 55, 61 and 62, Gonjo further discloses the heat exchanger (such as catalytic combustion portion, 6a or 6b) includes a chemical reactor (catalytic combustor) in thermal communication with the first chemical reactor (reformer).

Regarding limitations recited in claims 1, 7-9, 17, 22, 31, 68-70, 77-79 and 88-90 which are directed to a manner of operating disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP §2114 and 2115. Further, process limitations do not have a patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

4. Claims 13-15, 32, 48, 53, 54, 58 and 71-73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gonjo et al. (US 6,159,434) and Reiser (GB 2128013) as applied to claims 1, 17 and 25 above, and further in view of Toole et al. (US 4,167,915).

Regarding claims 13-15, 32, 48, 53, 54, 58 and 71-73 Gonjo, as modified by Reiser and discussed in claims 1, 17 and 25, teaches:

a first chemical reactor (reformer, 4, see Fig. 1A) comprising microchannels (compact plate style reformer with channels, see col. 28 lines 32-38 and see channels in Figs 6 and 7, for example) adapted to be in fluid communication with an inlet stream (liquid feed, see Fig. 1 A) and an outlet stream (Reformed Gas, see Fig. 1A) for carrying out a continuous process;

a second chemical reactor (catalytic combustor, 6a and 6b, see Fig. 1 A) in thermal communication with the first chemical reactor (see Fig. 1A, Where catalytic combustion portions 6a and 6b are in thermal communication with reforming portion 4);

wherein the first and second chemical reactors are coupled to each other (see flow diagram of Fig. 1A where reforming portion and catalytic combustion portion are fluidly connected);

wherein the first and second chemical reactors also include a heat exchanger upstream and downstream from said chemical reactors (see flow diagram in Fig. 1A where inlet and outlet streams of the first and second chemical reactors are in contact with a heat exchanger);

a pressure vessel (14) at least partially containing a operation therein (10, see Fig. 1), the pressure vessel concurrently adapted to be occupied by a medium (such as inert gas, supplied ) to compress the chemical reactor in order to prevent any leaking of reactants or products from the chemical reactor by maintaining a pressure inside the pressure vessel higher than the pressure in the chemical reactor (page 1 lines 45-52);

a stream adapted to be in fluid communication with an inert medium source (same as inert gas mentioned above) for conveying the inert medium from the inert medium source and into fluid communication with the first chemical reactor (page I lines 45-52); and

a recycle stream for cycling the compressive medium into and out of the pressure vessel (see flow diagram of Fig. I).

In other words, modified Gonjo teaches a pressure vessel that maintains and controls a pressure differential between the pressure vessel and the chemical reactors, as discussed

above, but fails to disclose the specific control mechanism that is used to maintain the pressures in the pressure vessel and the chemical reactor.

Toole also discloses a system that maintains and regulates pressures between a pressure vessel (shell, 5) that comprises an inert gas and a chemical reactor (wafer oxidation, 11).

Toole teaches a controller operatively coupled to a first sensor monitoring an internal pressure within the pressure vessel and a second sensor monitoring an internal pressure within the first chemical reactor (see outlet lines 22 and 23 from the pressure vessel and chemical reactor, respectively, which connect to back pressure regulators 61 and 64, which sense the pressure differential in the two spaces and adjust the outlet flows to reach the desired differential, see col. 4 lines 26-45). Furthermore, Toole discloses a vent (66) in fluid communication with the pressure vessel to selectively vent the inert medium (col. 4 lines 26-45). Toole teaches this configuration as a preferable means for simultaneously maintaining pressure control inside a pressure vessel as well as a chemical reactor inside said pressure vessel (col. 3 lines 3-17).

As such, it would have been obvious to one of ordinary skill to add the pressure control means of Toole, to modified Gonjo, in order to preferably control the pressure inside the pressure vessel at a higher pressure than that of the chemical reactors (as mentioned above}.

Regarding limitations recited in claim 58 which are directed to a manner of operating disclosed system, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate



apparatus claims from prior art. See MPEP §2114 and 2115. Further, process limitations do not have a patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim.

### ***Response to Arguments***

5. Applicant's arguments filed 4/29/08 have been fully considered but they are not persuasive.
6. On page 16, Applicant argues that Reiser teaches away from Gonjo by stating that "Reiser's deliberate leakage is precisely the opposite circumstance that is taught by Gonjo. Gonjo teaches away from having gaseous leaks, such as those embraced by Reiser."

The examiner understands Applicants argument, but respectfully disagrees. Reiser does not teach away from Gonjo with respect to the cited leakage of the stack in Gonjo. Both Reiser and Gonjo have devices in a plate style configuration which are designed to prevent the leakage of reactants/products out of the stack. In other words, while the structure of the stacks in Gonjo and Reiser are not identical, they are both designed to prevent outward leaks of products/reactants. It is also noted that the precise structure of the stack of Reiser is irrelevant, as Gonjo was not modified by the fuel cell stack of Reiser, but rather with the pressure vessel of Reiser which prevents leakage of products and chemicals out of the stack configuration. The concept of the pressure vessel inhibiting leakage is well known in the art and the combination

with Gonjo amounts to nothing more than the use of a known technique to improve similar devices in the same way.

### ***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. MERKLING whose telephone number is (571)272-9813. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1795

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. J. M./

Examiner, Art Unit 1795

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795